

### Research Highlight

Clouds reflect incoming energy from the sun but trap outgoing energy from the Earth. How much energy clouds retain versus reflect, however, determines their emissivity — their ability to act as a source of energy themselves.

Emissivity of clouds depends on more than just the total amount of clouds in the sky. The height at which they form could be equally important, a new study reports.

Satellite-based observations provide information about the tops of clouds, but not about their underbellies. “Therefore, ground-based observations of cloud[s] are still very important to understand the effect of cloud on the atmosphere and surface radiation balance,” writes Dr. Pan and his co-author Dr. Lu in a [research paper](#) published early this year in the journal *Science China: Earth Sciences*.

The researchers incorporated ground-based measurements in a sophisticated algorithm, the [Line-by-Line Radiative Transfer Model](#), to show that emissivity of clouds indeed decreases as the height of their bases increases. In other words, the higher the bases of the clouds are, the less those clouds can act as sources of energy.

The measurements, critical for calibrating the algorithm, were supplied by the U.S. Department of Energy’s Atmospheric Radiation Measurement (ARM) Climate Research Facility; [in 2008 ARM deployed one of its two mobile observatories in China’s Shouxian region to measure cloud radiation in the area](#).

The researchers claim the new algorithm significantly improves our ability to quantify the impact of clouds forming at different altitudes on the energy budget of the Earth.

### Reference(s)

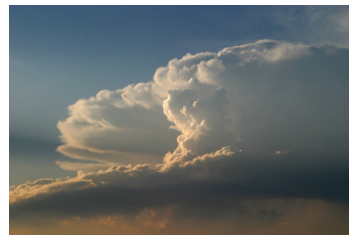
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### Working Group(s)

Cloud Life Cycle



Clouds with bases at different altitudes.